Operations on the Pancreas

Some Technical Considerations

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• Many diseases of the pancreas formerly universally considered fatal, now are known to be amenable to surgical therapy. Pancreatic cysts, pseudocysts, calculi, inflammation, and benign and malignant tumors all can be dealt with effectively by operation. In this presentation various surgical techniques which have proved to be of therapeutic importance are considered.

CONSIDERED from a surgical point of view, the pancreas is intimately related anatomically with neighboring organs and contiguous structures, such as the duodenum, the spleen, the common bile duct and the superior mesenteric and splenic vessels. At laparotomy it is obscured from view by the stomach, the gastrocolic omentum and the colon. The uncinate process almost completely surrounds the superior mesenteric vessels, while the lower end of the common duct usually traverses the head of the pancreas before entering the duodenum. Because of these close anatomical relationships, surgical operations upon the pancreas are not simple. They are usually time-consuming and may become extremely hazardous, especially in relation to the possible danger of injury to neighboring structures. Serious hemorrhage as well as persistent duodenal, bile or pancreatic fistulae are the well known consequences of faulty operative techniques.

Probably the most common lesions of the pancreas of surgical importance are acute and chronic inflammations. Many different surgical procedures, none universally successful, are currently employed in the treatment of pancreatitis. Most of them are based upon the concept that the disease is caused by increased pressure within the pancreatic ducts, presumably owing to obstruction of the main pancreatic duct, with continued secretion of pancreatic juice, or to obstruction in the common bile duct with reflux of bile into the pancreatic ducts.

Now that it has become recognized generally that laparotomy with incision and drainage of the pancreas is not effective treatment for acute pancreatitis of either the edematous or the acute hemorrhagic type, the acute stages of the disease, when recognized, are treated conservatively. Except in mild edematous pancreatitis, shock and rapid circulatory failure are early manifestations and must be treated vigorously. Surgical intervention at this stage causes death in a relatively high proportion of cases, and as the symptoms are much like those of other acute upper abdominal lesions which require early operation, correct differentiation becomes imperative. An elevation in serum amylase is an invaluable diagnostic aid.[7]

Although some surgeons have advocated T-tube drainage of the common duct in the acute stage of pancreatitis, evaluation of its effectiveness is difficult. Most surgeons agree that medical management in this stage is more effective. Splanchnic block with procaine is said to relieve the pain of an acute attack and to cause relaxation of the sphincter of Oddi, thus diminishing back pressure in the pancreatic ducts.[9] Here again it is difficult to know how long a given attack might have persisted without this added treatment. The author believes that most acute attacks of pancreatitis of the edematous type will subside spontaneously and that the acute hemorrhagic form will cause death in a high proportion of instances regardless of the kind of treatment.

Relapsing pancreatitis or recurring subacute pancreatitis has been treated by a number of procedures directed toward either improving drainage from the pancreatic duct or reducing pancreatic secretion through the reduction of gastric secretions. DeTakats and Walter[3] expressed belief that vagotomy or subtotal gastric resection may sufficiently decrease gastric secretions. Results from the various procedures have not been encouraging.

Chronic biliary tract disease is frequently associated with relapsing pancreatitis. Often cholecystectomy or choledochostomy for correction of the former will also relieve the latter. Prolonged drainage of the common bile duct has proven to be a very useful procedure. This can be accomplished either by T-tube drainage or by cholecystojejunostomy or choledochojejunostomy. Ascending infection of the biliary tract is liable to occur, however, unless anastomosis is made into a defunctionalized loop of

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bowel. Anastomosis to an intestinal limb of Roux-Y type or to a long loop of small bowel shunted with an entero-entero anastomosis tends to prevent ascending infection.

Many physicians have directed treatment toward relief of spasm or other kinds of obstruction of the sphincter of Oddi.[3] Archibald[2] as early as 1913 suggested division of the sphincter of Oddi. Doubilet and Mulholland[4] devised a special instrument which may be passed through the common duct into the duodenum, severing the sphincter of Oddi. Some surgeons have reported good results from transduodenal sphincterotomy.

Interruption of the autonomic sensory fibers by various procedures has been proposed not only as a means of controlling spasm of the sphincter but also to relieve pain, just as in the acute state of the disease. Some investigators have reported good results with simple unilateral splanchnicectomy while others have proposed more extensive procedures such as bilateral dorsal sympathectomy, splanchnicectomy and vagotomy.

Chronic pancreatitis, pancreatic calcinosis and pancreatic lithiasis are so frequently associated one with the other that they may be considered together in discussion of treatment. Intelligent surgical management of any of the conditions depends upon the clinical manifestations and the localization of the process. Rarely, a stone obstructing the main pancreatic duct can be removed by direct incision into the duct, followed by T-tube drainage.[5] Usually calcification is diffuse throughout the gland and nothing short of removal of all or part of the pancreas will suffice. When the disease process is confined to the head or tail of the pancreas, it may be successfully treated by partial excision of the gland. Usually, the disease involves so much of the gland and destruction is so extensive that there is little if any gland to be preserved. In such circumstances treatment is directed toward the control of pain. Total pancreatectomy followed by substitution therapy has been successful in a few cases. However, pancreatectomy for the relief of extensive pancreatitis with or without calcinosis is an extremely hazardous procedure, owing mainly to the danger of uncontrollable hemorrhage in the extremely vascular field.[13]

Neoplasms of the common duct, of the ampulla of Vater, of the head of the pancreas and of the duodenum involving the pancreas all lead to jaundice. The interest of many surgeons in recent years in problems associated with the surgical treatment of these conditions has led, in a large measure, to present concepts of operations on the pancreas. Means of controlling hemorrhage in jaundiced patients, control of infection, safe anesthesia for prolonged periods and meticulous surgical technique have made extensive resections of this region relatively safe and in certain conditions very much worthwhile. Often the major problem at the time of operation is the sometimes exceedingly difficult one of differentiation between stone in the common duct, chronic pancreatitis and periampullary carcinoma. Biopsy with a frozen section is not only apt to be misleading but can lead to serious postoperative complications. Usually clinical impression must be relied upon in determining the course of therapy.

The operability of malignancies in this region is often difficult to determine. Invasion of the tumor into the superior mesenteric vessels makes radical pancreaticoduodenectomy impractical. Although it is stated that the best way to determine whether or not such invasion is present is to reflect the duodenum and head of the pancreas medially, in the author's experience the uncinate process is usually so large that it surrounds the superior mesenteric vessels, both laterally and posteriorly, and reflection of the duodenum and pancreas only displaces these vessels and does not expose them. By transecting the gastrocolic and gastrohepatic omentum the junction of the body and head of the pancreas can be exposed and by gentle blunt dissection of the pancreas from its inferior and superior margins along the course of the mesenteric vessels, it is possible to determine whether there is fixation of a tumor mass to these vessels. In the author's opinion, other contraindications to resection are distant metastasis, irresectable local extension of tumor, and involvement of the portal vein with tumor.

If radical pancreaticoduodenectomy is undertaken, the most simple and most rapid reconstruction is important. The anastomosis of the bile duct to the small bowel should be at a point proximal to the gastroenterostomy, as should the anastomosis of the pancreatic stump. This is accomplished best by resecting the entire duodenum to a point beyond the ligament of Treitz. The jejunum then may be brought up anterior to the transverse colon and anastomosed end-to-end to the open end of the dilated common duct. If too great a discrepancy in size exists, an end-to-side anastomosis may be made and the open end of the jejunum closed. The stump of the pancreas is anastomosed end-to-side to the jejunum after the open end of the pancreas is closed with interrupted silk sutures. The pancreatic duct is permitted to protrude beyond this closed end. An incision is made in the wall of the jejunum through the serosa and muscularis just long enough that the closed end of the pancreas will fit into it. As these two structures are approximated, the protruding pancreatic duct is introduced into the lumen of the jejunum through a puncture wound in the mucous membrane. The duct and mucous membrane are tacked together with one or two fine catgut sutures. The serosa of the bowel is sutured then to the cap-

sule of the pancreas with interrupted silk sutures, thereby jutting the closed end of the pancreas against the outer surface of the mucous membrane of the bowel. The open end of the stomach then is sutured end-to-side to the jejunum. With this method there are only three suture lines, and as the bile duct and pancreas empty into a defunctionalized segment of bowel well above the gastroenterostomy, reflux of gastrointestinal contents into the biliary or pancreatic tree is prevented.

The utilization of this standard procedure for all conditions requiring resection of the head of the pancreas and duodenum has led to a surprisingly low operative mortality rate and a minimum of postoperative complications.

The successful management of cysts of the pancreas depends upon the underlying pathological condition which has led to the development of the cyst. True cysts are lined with epithelium and may be divided into three main classes: Retention cysts, congenital cysts and proliferative cysts. Pseudocysts are localized collections of fluid secondary to traumatic rupture or inflammation within the gland. The surgical procedure to be employed is dependent upon the type of cyst encountered, at operation. Because proliferative cysts are true neoplasms comprising the cystadenomas and cystadenocarcinomas, they must be extirpated.[12] Incision through pancreatic tissue beyond the gross limits of the tumor may be necessary to find a proper cleavage plane and to insure a margin of normal pancreas about the excised tumor mass. At times it is necessary to remove entire portions of the pancreas to insure complete extirpation of a potentially malignant cyst.

In contrast to proliferative cysts, pseudocysts of the pancreas occur quite frequently and may be treated by marsupialization and drainage, extirpation or internal drainage. Excision is rarely possible because of the fixation secondary to the inflammatory reaction which accompanies their formation. Dissection is difficult because it jeopardizes such important structures as the common duct and superior mesenteric, hepatic and splenic vessels, as well as the portal vein.

The major objection to marsupialization[10] is the persistence of a draining sinus tract. Digestion of the abdominal wall about the cutaneous opening may be expected and the condition is difficult to manage. Other complications are secondary infection, hemorrhage and, often, pronounced debility.

Internal drainage as a method of treatment not only eliminates the fistula formation of external drainage but is effective and is not as formidable a surgical procedure as complete excision. Various channels of drainage have been used—anastomosis of the cyst to the stomach, to the duodenum, to the jejunum and to the gallbladder—with varying degrees of success. Experience seems to have proven that internal drainage is best accomplished by anastomosis between the cyst and a defunctionalized loop of jejunum. This is accomplished either by the employment of a long loop of jejunum isolated by an entero-entero anastomosis or best by drainage into the defunctionalized limb of a Roux-Y intestinal anastomosis. The prevention of regurgitation of gastrointestinal contents into the cyst is important. The inflammatory, fibrous lining of a pseudocyst facilitates its obliteration after prolonged drainage.

Islet cell tumors of the pancreas may produce hyperinsulinism, causing the syndrome well known in association with insulin shock. Since W. J. Mayo's report of a malignant islet cell tumor in 1927 and Graham's report of a permanent cure of symptoms of hyperinsulinism following removal of a benign adenoma of islet cell tissue in 1929, a number of such cases have been recorded.[6] It is now recognized that surgical operation is the treatment of choice. Finding the tumor at the time of operation is often extremely difficult. It may be very small and of the same color and consistency as the remaining pancreatic tissue. Sometimes more than one tumor is present. For these reasons the entire pancreas must be exposed and adequately explored. The tumor when found is excised. When no tumor is found, resection of the body and tail (where about 80 per cent of the growths arise) and immediate inspection by a competent pathologist is advisable. If a tumor is not found in the excised portion, the head of the pancreas must be resected.

The results when the tumor is located and removed are excellent. Occasionally, good results follow extensive resection, even though no tumor is observed in the specimen. Only a small percentage of pancreatic tumors are malignant.

Annular pancreas, an exceedingly rare condition, may occasionally lead to chronic duodenal obstruction owing to the growth of a ring of pancreatic tissue around the second portion of the duodenum. The symptoms are best relieved by by-passing the process rather than by operation upon the gland because of the danger of injury to the pancreatic ducts. Gastric resection is indicated when the condition is complicated by gastric or duodenal ulcer.

Injuries to the pancreas caused by either concussive or penetrating wounds of the abdomen usually require immediate surgical management.[8] Pancreatitis secondary to blunt trauma often is unrecognized as such at the time of injury and may therefore lead to subsequent development of pancreatic pseudocyst. Penetrating wounds of the abdomen rarely involve the pancreas alone. The injury to the pancreas is usually discovered in association with penetrating injury to surrounding viscera. Complicated injuries

of this kind must be dealt with as indicated by conditions present at the time of operation. Careful repair of lacerations with ligation of the injured ducts should be carried out when possible. Resection of badly damaged pancreatic tissue often will prevent serious postoperative drainage and digestion. Proper drainage must be instituted if leakage of pancreatic secretions appears likely.

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Use of Gamma Globulin in Poliomyelitis

WHETHER GAMMA GLOBULIN will be effective in the prevention of paralytic poliomyelitis is not now known. On the basis of animal experiments and preliminary study on humans, it is possible that globulin will have value in human poliomyelitis, but serious questions remain to be answered before such a hope can be substantiated. Nevertheless, public dissemination of information on the status and objectives of current studies, incompletely presented or misunderstood, has created a serious demand for gamma globulin which cannot be met.

Virtually the entire output at current production rates is required to meet the demand for prevention or modification of the course of measles and infectious hepatitis.

Under the circumstances, it is obvious that the existing limited supply and current production of gamma globulin should be reserved for use in these diseases in which its efficiency has been established.

—Statement supplied by the chairman of the subcommittee on blood of the Health Resources Advisory Committee.